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Title: Wetland Delineation Report for Middle Mortandad Mesa Adjacent to  
Technical Area 55 at Los Alamos National Laboratory

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July 2021

# **Wetland Delineation Report for Middle Mortandad Mesa Adjacent to Technical Area 55 at Los Alamos National Laboratory**

Prepared by Jesse Berryhill, Brent Thompson, Faith Doty, and Alethea Banar  
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Los Alamos National Laboratory

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**CONTENTS**

Acronyms..... iv

Introduction..... 5

Site Description..... 5

Methods..... 5

Results..... 6

References..... 10

Attachment A: Site Photographs..... 11

Attachment B: Site Forms..... 16

**FIGURES**

Figure 1. Wetland Delineation Map.....8

Figure 2. NPDES Outfall 03A181. ....9

## **ACRONYMS**

GPS	Global Positioning System
LANL	Los Alamos National Laboratory
NPDES	National Pollutant Discharge Elimination System
TA	Technical Area
USAC	United States Army Corps of Engineers

## INTRODUCTION

This report provides the results of a wetland delineation conducted to support operational logistics for construction of a high-pressure water line that is planned to occur near a wetland at Los Alamos National Laboratory (LANL). The wetland reach is on the mesa edge in Technical Area (TA)-55 above the Mortandad Canyon watershed. This area has not been previously delineated; however, it drains to a canyon bottom where LANL updated a delineation in 2017 for the wetland adjacent to Technical Areas (TAs) 25, 48, and 55.

## SITE DESCRIPTION

The wetland reach sits on the north edge of the mesa and drains north into Mortandad Canyon. The entire wetland is within the boundary of TA-55. The southern end of the wetland is within the urbanized area of TA-55. The remainder is a mixture of formerly disturbed and revegetated area and undisturbed area. The majority of water to this area is a manmade source from TA-55 NPDES Outfall 03A181 (LANL 2019). Portions of the wetland are overlapped by three potential release sites: 42-002(b), 42-004, and 55-011(c). Caution was taken while soil sampling and material from sampling pits was returned to its point of origin. Past disturbances in this area include asphalt paving, structures, fill/gravel, and deposition of building debris.

## METHODS

LANL biologists conducted off-site preparatory work (online soil survey, reviewing of past reports, etc.) during the week of June 7–11, 2021 and conducted on-site fieldwork on June 15, 2021. All wetland delineation work was conducted in accordance of the 1987 U.S. Army Corps of Engineers Wetland Delineation Manual (USACE 1987) and the Arid West Regional supplement (USACE 2008).

A query of the National Wetland Plants List database yielded a New Mexico Specific 2016 Updated Wetland Plant List (Lichvar 2016) that was used as a reference for the site vegetation analysis. Vegetation lists for Los Alamos County (Keller 2011) and a handbook of wetland vegetation communities in New Mexico (Muldavin et al. 2000) were also consulted while identifying species and communities documented in the delineation. Prior wetland delineation reports for the upper Mortandad Canyon wetland (LANL 2013), the middle Mortandad Canyon wetland (USACE 2005), and the Wetland Delineation Report for Middle Mortandad Wetland Adjacent to Technical Area 35, 48 and 55 (LANL 2017) were also used as baselines and guides for this delineation.

Soil samples were collected according to methods in Appendix D Section 1 of the 1987 Corps Wetlands Delineations Manual (USAC 1987) and the Munsell Soil Color Book (Munsell Color 2010). Soil samples were taken with a 2 inch-diameter auger and inspected to determine physical properties (e.g. texture, color, structure) and hydric characteristics.

The wetland boundary was delineated by placing 21-inch wetland delineation pin flags along the wetland boundary (determined by wetland vegetation presence, soils and hydrology). Geospatial waypoints were collected along the boundary and at sample points using a Trimble Geo XT®

GPS device. Boundary points were downloaded and converted to a polygon shape file in ArcGIS.

Data from the delineation was recorded on Wetland Determination Data Form-Arid West Region forms (USACE 2008). Data sheets and digital photographs were taken at all sampling locations, and are included in Attachments A and B.

## RESULTS

The wetland area is approximately 0.13 acres in size (Figure 1). This area has not been previously delineated; however, it drains north to Mortandad Canyon bottom where LANL updated a delineation in 2017 for the wetland adjacent to Technical Areas (TAs) 25, 48, and 55.

Tree species observed in this wetland include paper birch (*Betula papyrifera* [note: not documented in the county list and non-native]), Russian olive (*Elaeagnus angustifolia*), Siberian elm (*Ulmus pumila*), ponderosa pine (*Pinus ponderosa*), saltcedar (*Tamarix ramosissima*), Douglas fir (*Pseudotsuga menziesii*), chokecherry (*Prunus virginiana*), bluestem willow (*Salix irrorata*), and coyote willow (*Salix exigua*). Other wetland indicator species observed and recorded include: mountain rush (*Juncus arcticus*), longstyle rush (*Juncus longistylis*), grassleaf rush (*Juncus marginatus*), poverty rush (*Juncus tenuis*), bottlebrush sedge (*Carex hystericina*), cattail (*Typha latifolia*), and broom sedge (*Carex scoparia*).

Hydrology is active and evident; however, the source is manmade. The water consists of treated cooling tower blowdown originating from TA-55 NPDES Outfall 03A181 (LANL 2019) (Figure 1). Flow is intermittent from a pipe near the southern edge of the wetland (Figure 2) with daily discharges that range from 2 to 3.5 million gallons per year. Water flows from the outfall through an area of base course and disperses into several braided channels flowing to the north and to the canyon edge. If changes were made to the current outfall such as rerouting water to another facility, reuse, or discharge to a different outfall, the wetland would no longer receive water beyond local average annual precipitation (approximately 18.79 inches/year).

A United States Department of Agriculture Natural Resources Conservation Service Web Soil Survey query was made for the area. The report generated by the area of interest query summarized the two soil types found in this area as “rock outcrop (124)” and “local very fine sandy loam (228).” Both categories are described as general, miscellaneous, and non-hydric. Subsurface parent material consists of volcanic tuff. The area has had human disturbance in the past including asphalt paving, structures, fill/gravel, and deposition of building debris.

Four soil samples were taken within and on the boundary of the wetland (sample points 1, 2, 3, and 5) and one soil sample was taken in an adjacent upland area (sample point 4). See photos of soil core samples in Attachment B. Saturated soil was encountered in all but the upland sample. Water was observed running through a well-drained substrate that included fill and gravel material from former disturbances. Indicators of hydric soils were present but not well defined. Soil sample 5 exhibited gleying and a reduced environment at the 3-4 inch depth. Decayed/ing organic matter including cattail and grass roots were observed in all samples taken within the wetland boundary. The soils were primarily composed of sand, gravel, organic matter, saturated and decaying tuff, and small amounts of clay. Soil sample 4 taken in the upland area, adjacent to

the wetland, displayed a texture and structure similar to those found in the wetland, but with dry conditions and lacking significant quantities of organic matter. Overall, the depth of soil is shallow with bedrock being encountered 2.5 to 7 inches below ground surface. Only soil sample 2 was excavated deeper, to 27 inches, before encountering cobble and large gravel.



# Wetland Delineation for Middle Mortandad Mesa Adjacent to Technical Area 55



Figure 1. Wetland Delineation Map.





**Figure 2. NPDES Outfall 03A181.**

## REFERENCES

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## ATTACHMENT A: SITE PHOTOGRAPHS



**Photo 1. Sample point 1, view east to west.**



**Photo 2. Soil Sample at Sample Point 1.**





**Photo 3. Sample point 2, view west to east.**



**Photo 4. Soil Sample at Sample Point 2.**





**Photo 5. Sample point 3 outside the fence, view east to west.**



**Photo 6. Soil Sample at Sample Point 3.**





**Photo 7. Sample Point 4, looking north**



**Photo 8. Soil Sample at Sample Point 4.**





**Photo 9. Sample Point 5, view west to east**



**Photo 10. Soil Sample at Sample Point 5**

## ATTACHMENT B: SITE FORMS

## WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: TA-55 Middle Mortandad Mesa City/County: Los Alamos/Los Alamos Sampling Date: 06-15-2021  
 Applicant/Owner: LANL/DOE State: NM Sampling Point: 1  
 Investigator(s): Jesse Berryhill, Brent Thompson, Faith Doty, A Section, Township, Range: R06E T19N  
 Landform (hillslope, terrace, etc.): mesa top/bench Local relief (concave, convex, none): convex Slope (%): ~30  
 Subregion (LRR): D - Interior Deserts Lat: 35.86 Long: -106.301 Datum: NAD 83  
 Soil Map Unit Name: USDA NRCS Web Soil Survey: NM656 NWI classification: None Listed  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	
Wetland Hydrology Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Sampling location is along the fenceline, across from the oufall. The southern end of the wetland is within the urbanized area of TA-55. The remainder is a mixture of formerly disturbed/revegetated area and undisturbed area. Past disturbances include asphalt paving, structures, fill/gravel, and building debris.		

## VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: <u>1</u> (A) Total Number of Dominant Species Across All Strata: <u>1</u> (B) Percent of Dominant Species That Are OBL, FACW, or FAC: <u>100.0%</u> (A/B)
1. _____				
2. _____				
3. _____				
4. _____				
Total Cover: <u>5</u> %				
Sapling/Shrub Stratum				
1. <u>Salix exigua</u>	<u>5</u>	No	OBL	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2. _____				
3. _____				
4. _____				
Total Cover: <u>5</u> %				
Herb Stratum				
1. <u>Typha latifolia</u>	<u>90</u>	Yes	OBL	Hydrophytic Vegetation Present? Yes <input checked="" type="radio"/> No <input type="radio"/>
2. <u>Epilobium spp.</u>	<u>5</u>	No	FACW	
3. _____				
4. _____				
Total Cover: <u>95</u> %				
Woody Vine Stratum				
1. _____				
2. _____				
Total Cover: _____ %				
% Bare Ground in Herb Stratum <u>0</u> % % Cover of Biotic Crust <u>0</u> %				
Remarks: Dense cattail dominated location, surface water moving throughout.				



## WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: TA-55 Middle Mortandad Mesa City/County: Los Alamos/Los Alamos Sampling Date: 06-15-2021  
 Applicant/Owner: LANL/DOE State: NM Sampling Point: 2  
 Investigator(s): Jesse Berryhill, Brent Thompson, Faith Doty, A Section, Township, Range: R06E T19N  
 Landform (hillslope, terrace, etc.): mesa top/bench Local relief (concave, convex, none): convex Slope (%): ~30  
 Subregion (LRR): D - Interior Deserts Lat: 35.86 Long: -106.301 Datum: NAD 83  
 Soil Map Unit Name: USDA NRCS Web Soil Survey: NM656 NWI classification: None Listed  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/>	No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present?	Yes <input type="radio"/>	No <input checked="" type="radio"/>	
Wetland Hydrology Present?	Yes <input checked="" type="radio"/>	No <input type="radio"/>	
Remarks: Soil sample taken south of outer fence, northwest of outfall, halfway between gravel and the fence. The southern end of the wetland is within the urbanized area of TA-55. The remainder is a mixture of formerly disturbed/revegetated area and undisturbed area. Past disturbances include asphalt paving, structures, fill/gravel, and building debris.			

## VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)																					
1.																									
2.																									
3.																									
4.																									
Total Cover: %																									
<b>Sapling/Shrub Stratum</b>																									
1. <i>Salix Exigua</i>	5	No	OBL	<b>Prevalence Index worksheet:</b> <table border="1"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> <th></th> </tr> </thead> <tbody> <tr> <td>OBL species 25</td> <td>x 1 =</td> <td>25</td> </tr> <tr> <td>FACW species 72</td> <td>x 2 =</td> <td>144</td> </tr> <tr> <td>FAC species 3</td> <td>x 3 =</td> <td>9</td> </tr> <tr> <td>FACU species</td> <td>x 4 =</td> <td>0</td> </tr> <tr> <td>UPL species</td> <td>x 5 =</td> <td>0</td> </tr> <tr> <td>Column Totals: 100 (A)</td> <td></td> <td>178 (B)</td> </tr> </tbody> </table> Prevalence Index = B/A = 1.78	Total % Cover of:	Multiply by:		OBL species 25	x 1 =	25	FACW species 72	x 2 =	144	FAC species 3	x 3 =	9	FACU species	x 4 =	0	UPL species	x 5 =	0	Column Totals: 100 (A)		178 (B)
Total % Cover of:	Multiply by:																								
OBL species 25	x 1 =	25																							
FACW species 72	x 2 =	144																							
FAC species 3	x 3 =	9																							
FACU species	x 4 =	0																							
UPL species	x 5 =	0																							
Column Totals: 100 (A)		178 (B)																							
2.																									
3.																									
4.																									
5.																									
Total Cover: 5 %																									
<b>Herb Stratum</b>																									
1. <i>Typha latifolia</i>	20	No	OBL	<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)																					
2. <i>Epilobium spp.</i>	10	No	FACW																						
3. <i>Carex scoparia</i>	60	Yes	FACW																						
4. <i>Agrostis gigantea</i>	2	No	FACW																						
5.																									
6.																									
7.																									
8.																									
Total Cover: 92 %																									
<b>Woody Vine Stratum</b>																									
1. <i>Parthenocissus quinquefolia</i>	3	No	FAC	<sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.																					
2.																									
Total Cover: 3 %																									
% Bare Ground in Herb Stratum 0 %	% Cover of Biotic Crust 0 %	<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>																							
Remarks: Densely vegetated location with no tree component and saturated soils. Surface water not present.																									



**SOIL**

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (inches)	Matrix		Redox Features			Texture <sup>3</sup>	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>		
0-3	10YR 3/2						Sand Rhizomes and roots
4-6	10YR 4/3						Sand Fine roots, sandy, pea-size gravel
7-9	10YR 4/3						Sand Small amounts of clay or increased
10-14	YR 5 or 4/2						Sandy Loam Slightly increased clay or organic
15-21	10YR 2/2						Sandy Loam More cohesive, big mottles when
22-27	10YR 2/2						Sandy Loam fewer particles of saturated tuff,
<sup>1</sup> Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup> Location: PL=Pore Lining, RC=Root Channel, M=Matrix. <sup>3</sup> Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.							
<b>Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)</b>							
<input type="checkbox"/> Histosol (A1) <input type="checkbox"/> Sandy Redox (S5) <input type="checkbox"/> Indicators for Problematic Hydric Soils <sup>4</sup> :							
<input type="checkbox"/> Histic Epipedon (A2) <input type="checkbox"/> Stripped Matrix (S6) <input type="checkbox"/> 1 cm Muck (A9) (LRR C)							
<input type="checkbox"/> Black Histic (A3) <input type="checkbox"/> Loamy Mucky Mineral (F1) <input type="checkbox"/> 2 cm Muck (A10) (LRR B)							
<input type="checkbox"/> Hydrogen Sulfide (A4) <input type="checkbox"/> Loamy Gleyed Matrix (F2) <input type="checkbox"/> Reduced Vertic (F18)							
<input type="checkbox"/> Stratified Layers (A5) (LRR C) <input type="checkbox"/> Depleted Matrix (F3) <input type="checkbox"/> Red Parent Material (TF2)							
<input type="checkbox"/> 1 cm Muck (A9) (LRR D) <input type="checkbox"/> Redox Dark Surface (F6) <input type="checkbox"/> Other (Explain in Remarks)							
<input type="checkbox"/> Depleted Below Dark Surface (A11) <input type="checkbox"/> Depleted Dark Surface (F7)							
<input type="checkbox"/> Thick Dark Surface (A12) <input type="checkbox"/> Redox Depressions (F8)							
<input type="checkbox"/> Sandy Mucky Mineral (S1) <input type="checkbox"/> Vernal Pools (F9)							
<input type="checkbox"/> Sandy Gleyed Matrix (S4)							
<sup>4</sup> Indicators of hydrophytic vegetation and wetland hydrology must be present.							
<b>Restrictive Layer (if present):</b>							
Type: Cobble/large gravel							
Depth (inches): 27 inches							
Hydric Soil Present? Yes <input type="radio"/> No <input checked="" type="radio"/>							
Remarks: Saturated throughout, no redox features/gley/iron or otherwise, chunks of saturated tuff and other porous overburden that were breaking down, approx 24-in water table/refill depth, sandy throughout, clay or organic matter increasing w/ depth but not at a significant texture percentage- just enough to hold the soil bore together.							

**HYDROLOGY**

Wetland Hydrology Indicators:				Secondary Indicators (2 or more required)	
Primary Indicators (any one indicator is sufficient)					
<input checked="" type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Water Marks (B1) (Riverine)			
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Biotic Crust (B12)	<input type="checkbox"/> Sediment Deposits (B2) (Riverine)			
<input checked="" type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Drift Deposits (B3) (Riverine)			
<input type="checkbox"/> Water Marks (B1) (Nonriverine)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Drainage Patterns (B10)			
<input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Dry-Season Water Table (C2)			
<input type="checkbox"/> Drift Deposits (B3) (Nonriverine)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Thin Muck Surface (C7)			
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Crayfish Burrows (C8)			
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)			
<input type="checkbox"/> Water-Stained Leaves (B9)		<input type="checkbox"/> Shallow Aquitard (D3)			
		<input type="checkbox"/> FAC-Neutral Test (D5)			
<b>Field Observations:</b>					
Surface Water Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches):	0-3 in		
Water Table Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches):	0-3 in		
Saturation Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Depth (inches):	Throughout		
(includes capillary fringe)				Wetland Hydrology Present? Yes <input checked="" type="radio"/> No <input type="radio"/>	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:					
NPDES Outfall 03A181 flow data					
Remarks:					

## WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: TA-55 Middle Mortandad Mesa City/County: Los Alamos/Los Alamos Sampling Date: 06-15-2021  
 Applicant/Owner: LANL/DOE State: NM Sampling Point: 3  
 Investigator(s): Jesse Berryhill, Brent Thompson, Faith Doty, A Section, Township, Range: R06E T19N  
 Landform (hillslope, terrace, etc.): mesa top/bench Local relief (concave, convex, none): none Slope (%): ~20  
 Subregion (LRR): D - Interior Deserts Lat: 35.86 Long: -106.301 Datum: NAD 83  
 Soil Map Unit Name: USDA NRCS Web Soil Survey: NM656 NWI classification: None Listed  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	
Wetland Hydrology Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Soil sample taken outside fence, in cattails, close to fence and across from outfall. The southern end of the wetland is within the urbanized area of TA-55. The remainder is a mixture of formerly disturbed/revegetated area and undisturbed area. Past disturbances include asphalt paving, structures, fill/gravel, and building debris.		

## VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	<b>Dominance Test worksheet:</b> Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 1 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)														
1.																		
2.																		
3.																		
4.																		
Total Cover: %				<b>Prevalence Index worksheet:</b> <table border="1"> <thead> <tr> <th>Total % Cover of:</th> <th>Multiply by:</th> </tr> </thead> <tbody> <tr> <td>OBL species 100</td> <td>x 1 = 100</td> </tr> <tr> <td>FACW species</td> <td>x 2 = 0</td> </tr> <tr> <td>FAC species</td> <td>x 3 = 0</td> </tr> <tr> <td>FACU species</td> <td>x 4 = 0</td> </tr> <tr> <td>UPL species</td> <td>x 5 = 0</td> </tr> <tr> <td>Column Totals: 100 (A)</td> <td>100 (B)</td> </tr> </tbody> </table> Prevalence Index = B/A = 1.00	Total % Cover of:	Multiply by:	OBL species 100	x 1 = 100	FACW species	x 2 = 0	FAC species	x 3 = 0	FACU species	x 4 = 0	UPL species	x 5 = 0	Column Totals: 100 (A)	100 (B)
Total % Cover of:	Multiply by:																	
OBL species 100	x 1 = 100																	
FACW species	x 2 = 0																	
FAC species	x 3 = 0																	
FACU species	x 4 = 0																	
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Column Totals: 100 (A)	100 (B)																	
Sapling/Shrub Stratum																		
1.																		
2.																		
3.																		
4.																		
5.																		
Total Cover: %																		
Herb Stratum																		
1. <i>Typha latifolia</i>	100	Yes	OBL															
2.																		
3.																		
4.																		
5.																		
6.																		
7.																		
8.																		
Total Cover: 100%																		
Woody Vine Stratum																		
1.																		
2.																		
Total Cover: %																		
% Bare Ground in Herb Stratum 0 %	% Cover of Biotic Crust 0 %																	
<b>Hydrophytic Vegetation Present?</b> Yes <input checked="" type="radio"/> No <input type="radio"/>																		
<b>Hydrophytic Vegetation Indicators:</b> <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is $\leq 3.0^1$ <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain) <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.																		
Remarks: Dense cattail dominated stand.																		



## WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: TA-55 Middle Mortandad Mesa City/County: Los Alamos/Los Alamos Sampling Date: 06-15-2021  
 Applicant/Owner: LANL/DOE State: NM Sampling Point: 4  
 Investigator(s): Jesse Berryhill, Brent Thompson, Faith Doty, A Section, Township, Range: R06E T19N  
 Landform (hillslope, terrace, etc.): mesa top/bench Local relief (concave, convex, none): none Slope (%): ~20  
 Subregion (LRR): D - Interior Deserts Lat: 35.86 Long: -106.301 Datum: NAD 83  
 Soil Map Unit Name: USDA NRCS Web Soil Survey: NM656 NWI classification: None Listed  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input type="radio"/> No <input checked="" type="radio"/>
Hydric Soil Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	
Wetland Hydrology Present?	Yes <input type="radio"/> No <input checked="" type="radio"/>	
Remarks: The southern end of the wetland is within the urbanized area of TA-55. The remainder is a mixture of formerly disturbed/revegetated area and undisturbed area. Past disturbances include asphalt paving, structures, fill/gravel, and building debris.		

## VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status	Dominance Test worksheet: Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A) Total Number of Dominant Species Across All Strata: 2 (B) Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0 % (A/B)
1. <i>Pinus ponderosa</i>	80	Yes	FACU	
2.				Prevalence Index worksheet: Total % Cover of: Multiply by: OBL species 0 x 1 = 0 FACW species 8 x 2 = 16 FAC species 10 x 3 = 30 FACU species 80 x 4 = 320 UPL species 5 x 5 = 25 Column Totals: 103 (A) 391 (B) Prevalence Index = B/A = 3.80
3.				
4.				
Total Cover: 80 %				
Sapling/Shrub Stratum				
1. <i>Prunus virginiana</i>	10	No	FAC	Hydrophytic Vegetation Indicators: <input checked="" type="checkbox"/> Dominance Test is >50% <input checked="" type="checkbox"/> Prevalence Index is ≤3.0 <sup>1</sup> <input type="checkbox"/> Morphological Adaptations <sup>1</sup> (Provide supporting data in Remarks or on a separate sheet) <input type="checkbox"/> Problematic Hydrophytic Vegetation <sup>1</sup> (Explain)  <sup>1</sup> Indicators of hydric soil and wetland hydrology must be present.
2.				
3.				
4.				
5.				
Total Cover: 10 %				Hydrophytic Vegetation Present? Yes <input type="radio"/> No <input checked="" type="radio"/>
Herb Stratum				
1. <i>Agrostis gigantea</i>	8	Yes	FACW	Remarks: Sample point 4 is located in an upland area to the west of the wetland area. Wetland boundary identified based on vegetation, soils and hydrology present.
2. <i>Elymus elymoides</i>	5	No	UPL	
3.				
4.				
5.				
6.				
7.				
8.				
Total Cover: 13 %				
Woody Vine Stratum				
1.				
2.				
Total Cover: %				
% Bare Ground in Herb Stratum 10 %	% Cover of Biotic Crust 0 %			

US Army Corps of Engineers

Arid West - Version 11-1-2006

## SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture <sup>3</sup>	Remarks
	Color (moist)	%	Color (moist)	%	Type <sup>1</sup>	Loc <sup>2</sup>		
0-7	10YR 5/4	100	none				Sandy Loam	(see remarks)

<sup>1</sup>Type: C=Concentration, D=Depletion, RM=Reduced Matrix. <sup>2</sup>Location: PL=Pore Lining, RC=Root Channel, M=Matrix.<sup>3</sup>Soil Textures: Clay, Silty Clay, Sandy Clay, Loam, Sandy Clay Loam, Sandy Loam, Clay Loam, Silty Clay Loam, Silt Loam, Silt, Loamy Sand, Sand.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- |  |   |
|--|---|
| <input type="checkbox"/> Histosol (A1)                     | <input type="checkbox"/> Sandy Redox (S5)           |
| <input type="checkbox"/> Histic Epipedon (A2)              | <input type="checkbox"/> Stripped Matrix (S6)       |
| <input type="checkbox"/> Black Histic (A3)                 | <input type="checkbox"/> Loamy Mucky Mineral (F1)   |
| <input type="checkbox"/> Hydrogen Sulfide (A4)             | <input type="checkbox"/> Loamy Gleyed Matrix (F2)   |
| <input type="checkbox"/> Stratified Layers (A5) (LRR C)    | <input type="checkbox"/> Depleted Matrix (F3)       |
| <input type="checkbox"/> 1 cm Muck (A9) (LRR D)            | <input type="checkbox"/> Redox Dark Surface (F6)    |
| <input type="checkbox"/> Depleted Below Dark Surface (A11) | <input type="checkbox"/> Depleted Dark Surface (F7) |
| <input type="checkbox"/> Thick Dark Surface (A12)          | <input type="checkbox"/> Redox Depressions (F8)     |
| <input type="checkbox"/> Sandy Mucky Mineral (S1)          | <input type="checkbox"/> Vernal Pools (F9)          |
| <input type="checkbox"/> Sandy Gleyed Matrix (S4)          |   |

Indicators for Problematic Hydric Soils<sup>4</sup>:

- |   |
|---|
| <input type="checkbox"/> 1 cm Muck (A9) (LRR C)     |
| <input type="checkbox"/> 2 cm Muck (A10) (LRR B)    |
| <input type="checkbox"/> Reduced Vertic (F18)       |
| <input type="checkbox"/> Red Parent Material (TF2)  |
| <input type="checkbox"/> Other (Explain in Remarks) |

<sup>4</sup>Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 6-7 in

Hydric Soil Present? Yes ☐ No ☒

Remarks: 1-inch approximate layer of duff, some tuff outcroppings less than 4-ft from soil pit, dry. 6-7 inches to bedrock, uniform throughout, sandy and gritty, gravel/grit from birdseed size to grape-sized, some pine needles in top 2-3 inches, dry/no structure, soil fell apart once removed, sediments felt similar to those within the wetlands-but dry and lacking organic matter

## HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- |  |  |
|--|--|
| <input type="checkbox"/> Surface Water (A1)                        | <input type="checkbox"/> Salt Crust (B11)                              |
| <input type="checkbox"/> High Water Table (A2)                     | <input type="checkbox"/> Biotic Crust (B12)                            |
| <input type="checkbox"/> Saturation (A3)                           | <input type="checkbox"/> Aquatic Invertebrates (B13)                   |
| <input type="checkbox"/> Water Marks (B1) (Nonriverine)            | <input type="checkbox"/> Hydrogen Sulfide Odor (C1)                    |
| <input type="checkbox"/> Sediment Deposits (B2) (Nonriverine)      | <input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3) |
| <input type="checkbox"/> Drift Deposits (B3) (Nonriverine)         | <input type="checkbox"/> Presence of Reduced Iron (C4)                 |
| <input type="checkbox"/> Surface Soil Cracks (B6)                  | <input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)    |
| <input type="checkbox"/> Inundation Visible on Aerial Imagery (B7) | <input type="checkbox"/> Other (Explain in Remarks)                    |
| <input type="checkbox"/> Water-Stained Leaves (B9)                 |  |

Secondary Indicators (2 or more required)

- |  |
|--|
| <input type="checkbox"/> Water Marks (B1) (Riverine)               |
| <input type="checkbox"/> Sediment Deposits (B2) (Riverine)         |
| <input type="checkbox"/> Drift Deposits (B3) (Riverine)            |
| <input type="checkbox"/> Drainage Patterns (B10)                   |
| <input type="checkbox"/> Dry-Season Water Table (C2)               |
| <input type="checkbox"/> Thin Muck Surface (C7)                    |
| <input type="checkbox"/> Crayfish Burrows (C8)                     |
| <input type="checkbox"/> Saturation Visible on Aerial Imagery (C9) |
| <input type="checkbox"/> Shallow Aquitard (D3)                     |
| <input type="checkbox"/> FAC-Neutral Test (D5)                     |

Field Observations:

Surface Water Present? Yes ☐ No ☒ Depth (inches):Water Table Present? Yes ☐ No ☒ Depth (inches):Saturation Present? (includes capillary fringe) Yes ☐ No ☒ Depth (inches):Wetland Hydrology Present? Yes ☐ No ☒

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

## WETLAND DETERMINATION DATA FORM - Arid West Region

Project/Site: TA-55 Middle Mortandad Mesa City/County: Los Alamos/Los Alamos Sampling Date: 06-15-2021  
 Applicant/Owner: LANL/DOE State: NM Sampling Point: 5  
 Investigator(s): Jesse Berryhill, Brent Thompson, Faith Doty, A Section, Township, Range: R06E T19N  
 Landform (hillslope, terrace, etc.): mesa top/bench Local relief (concave, convex, none): none Slope (%): ~20  
 Subregion (LRR): D - Interior Deserts Lat: 35.86 Long: -106.301 Datum: NAD 83  
 Soil Map Unit Name: USDA NRCS Web Soil Survey: NM656 NWI classification: None Listed  
 Are climatic / hydrologic conditions on the site typical for this time of year? Yes ☒ No ☐ (If no, explain in Remarks.)  
 Are Vegetation ☐ Soil ☒ or Hydrology ☐ significantly disturbed? Are "Normal Circumstances" present? Yes ☒ No ☐  
 Are Vegetation ☐ Soil ☐ or Hydrology ☐ naturally problematic? (If needed, explain any answers in Remarks.)

## SUMMARY OF FINDINGS - Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	Is the Sampled Area within a Wetland? Yes <input checked="" type="radio"/> No <input type="radio"/>
Hydric Soil Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	
Wetland Hydrology Present?	Yes <input checked="" type="radio"/> No <input type="radio"/>	
Remarks: Soil sample taken north of outer fence, further down/away from fence line. The southern end of the wetland is within the urbanized area of TA-55. The remainder is a mixture of formerly disturbed/revegetated area and undisturbed area. Past disturbances include asphalt paving, structures, fill/gravel, and building debris.		

## VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1. <i>Pinus ponderosa</i>	15	Yes	FACU
2. <i>Ulmus pumila</i>	10	No	NI
3. <i>Eleagnus angustifolia</i>	8	No	FACW
4.			
Total Cover: 33 %			
<b>Sapling/Shrub Stratum</b>			
1. <i>Prunus virginiana</i>	10	No	FAC
2. <i>Salix irrorata</i>	25	Yes	FACW*
3.			
4.			
5.			
Total Cover: 35 %			
<b>Herb Stratum</b>			
1. <i>Graminoid spp.</i>	10	Yes	NI
2. <i>Typha latifolia</i>	5	No	OBL
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover: 15 %			
<b>Woody Vine Stratum</b>			
1.			
2.			
Total Cover: %			
% Bare Ground in Herb Stratum 20 %	% Cover of Biotic Crust 0 %		

**Dominance Test worksheet:**  
 Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)  
 Total Number of Dominant Species Across All Strata: 3 (B)  
 Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3 % (A/B)

**Prevalence Index worksheet:**  

Total % Cover of:	Multiply by:	
OBL species 5	x 1 =	5
FACW species 33	x 2 =	66
FAC species 10	x 3 =	30
FACU species 15	x 4 =	60
UPL species 20	x 5 =	100
Column Totals: 83	(A)	261 (B)

 Prevalence Index = B/A = 3.14

**Hydrophytic Vegetation Indicators:**  
☒ Dominance Test is >50%  
☒ Prevalence Index is ≤3.0<sup>1</sup>  
☐ Morphological Adaptations<sup>1</sup> (Provide supporting data in Remarks or on a separate sheet)  
☐ Problematic Hydrophytic Vegetation<sup>1</sup> (Explain)

<sup>1</sup>Indicators of hydric soil and wetland hydrology must be present.

**Hydrophytic Vegetation Present?** Yes ☒ No ☐

Remarks: Shaded and open understory, lacking hydrophytic herb/forb component, surface water flowing throughout.

